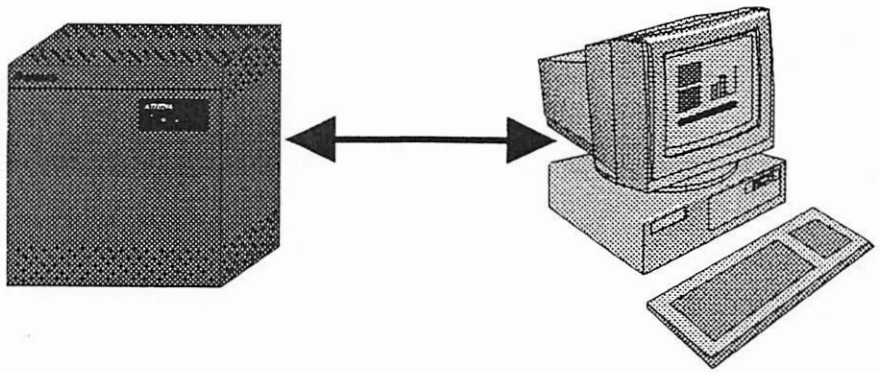
DEVELOPER'S TOOLKIT

AXXESS: System-Level OAI



VERSION 1.0

Design Engineering

Innovation through Creativity

I/T Part No: 550.8200

System OAI Toolkit

SN: 29449078S

SECTION 1: Overview

Welcome to the ***AXXESS*** **System OAI Developer's Toolkit.** As you are probably aware, the AXXESS telephone system is not only a powerful stand-alone telephone system, but also has several "Open-Architecture Interfaces" (OAI) that allow computers to be attached to the phone system to provide even more powerful customer solutions. This toolkit is intended to provide the necessary information and tools that you need to interface with and develop solutions using the ***AXXESS*** **System OAI link**.

This toolkit will continue to evolve and improve over time and we welcome your input to help us make it better. So please write us or FAX us at the address shown on your 'Registration Form' any time with your suggestions.

Toolkit Contents

This document is organized into sections to make it easier to use as a reference document. The following table shows what is contained in each section:

Section	Description
1	Overview/Registration (this Section)
2	Support Program
3	Protocol Specification
4	Application Notes
5	Development Tools

SECTION 1: License

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SECTION 1: Registration

Please find the registration form on the following page, and fill it out and either mail it or FAX it to us right away. This will allow us to enter your information and serial number into our database so we can 'enable' our technical support for you and also to be able to keep you informed with updated information and related products.

OAI Support Overview

The OAI Support Group is available to ***Axxess OAI Developers*** to provide technical support and access to OAI Design Engineers. This OAI Support is accessible through several electronic mediums (E-Mail and 'Forums') in addition to standard telephone and FAX calls. The electronic 'forums' can be especially useful because developers can access the latest application notes, sample codes, and general information 24-hours/day without directly contacting the OAI Support Group.

When the OAI Support group is contacted, there are two levels of support: 'Basic' (level 1) and 'Advanced' (level 2). The 'Basic' support level is free (no charge) and is always the initial starting point for each new support 'call'. At this 'Basic' level, OAI developers can request product information, report problems, suggest product enhancements, and request information or application notes on existing OAI integrations.

The 'Advanced' support level is billable on a per 'Incident' basis and provides access to the Software Design Engineers within the OAI Support group to help solve the more difficult integration issues/problems and also to provide some direct development resources. Please refer to the following section on "Support Incidents" for more details on these support levels.

Figure 1 illustrates the "typical" flow of a OAI support call.

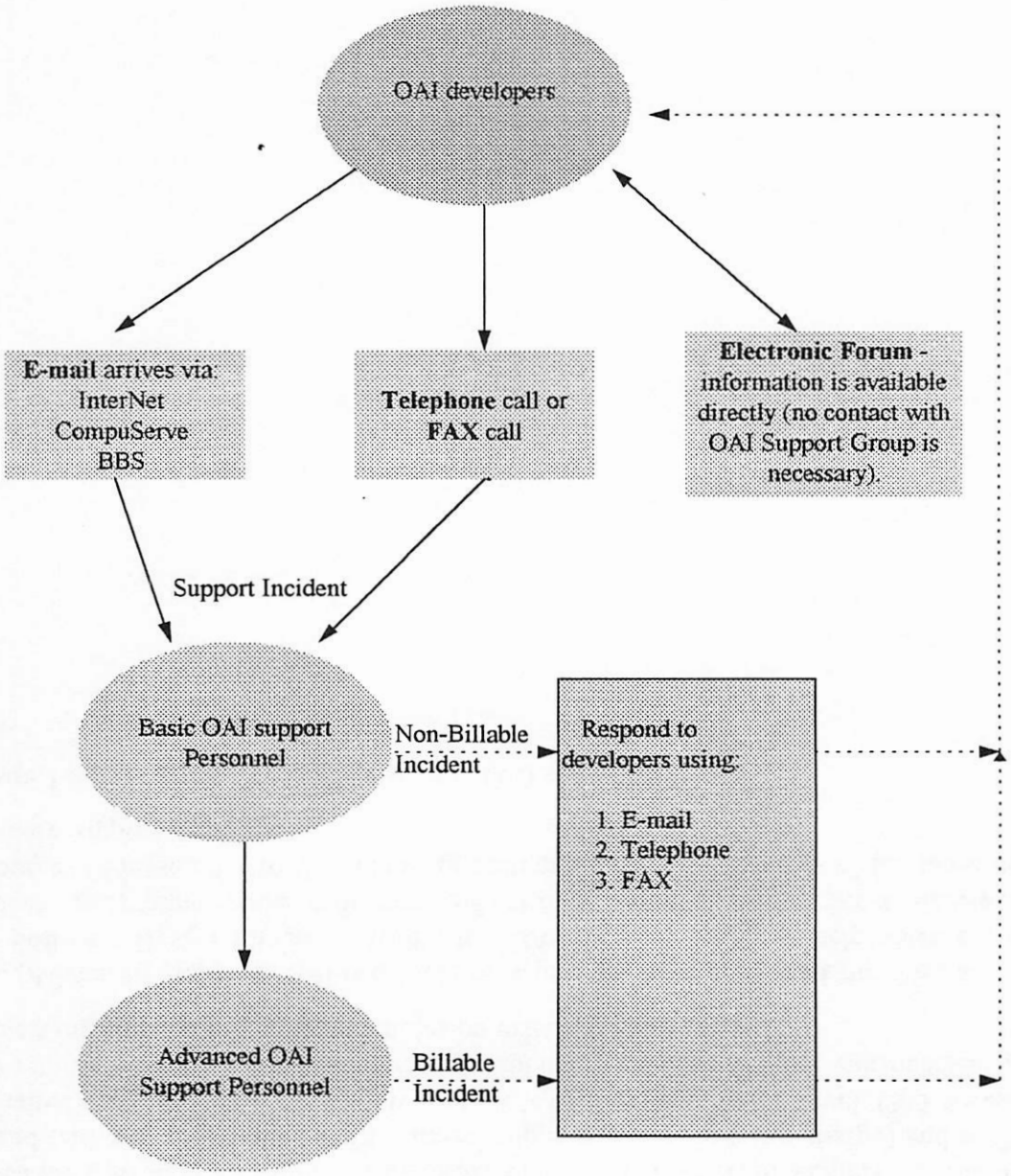

OAI developers
E-mail arrives via:
InterNet
CompuServe
BBS
Telephone call or
FAX call
Electronic Forum -
information is available
directly (no contact with
OAI Support Group is
necessary).
Support Incident
Basic OAI support
Personnel
Non-Billable
Incident
Respond to
developers using:
1. E-mail
2. Telephone
3. FAX
Advanced OAI
Support Personnel
Billable
Incident

Figure 1

E-Mail / Electronic Mediums

CompuServe

The OAI Support Group maintains a sub-forum for 'OAI developers' on CompuServe. This provides (1) Electronic mail and (2) some file storage areas for on-line perusal and uploads/downloads.

The CompuServe address to send E-mail to the OAI Support and the CompuServe sub-form information will be FAXed to you when your Registration form has been received and processed.

InterNet E-mail

The OAI Support Group will response to E-mail messages on the ***InterNet***. These E-mail messages can also have files attached so it is fairly simple to send binary files, word processing documents, or plain ASCII files. Since the ***InterNet*** is accessible from many other 'On-Line' electronic mail services it provides almost universal access.

The InterNet address for the OAI support group information will be FAXed to you when your Registration form has been received and processed

Inter-Tel BBS

The OAI Support Group will also provide an electronic bulletin board service (BBS) for those not wishing to subscribe to CompuServe or InterNet. This BBS will contain OAI information, including Application notes, sample code, and other relevant OAI information, that can be accessed 24-hours/day seven days/week using a dialup modem. Once your registration form has been received and processed, you will be given an account and access information to reach this BBS.

Telephone & FAX Calls

The OAI Support group can be reached by telephone by calling the current Inter-Tel telephone support phone number 800-669-5858 (or 602-961-9000) and requesting the "OAI Support Group". The OAI Support Group is staffed between 8AM and 5PM Mountain Standard time on normal business days, but when all group members are busy or after hours you will reach a voice mail box where you can leave a detailed message.

The OAI Support group can also be contacted by FAX which can be quite useful for describing problems or attaching printouts. This FAX number is 602-961-6940 and is available 24 hours/day.

Support Incidents

A support incident is a question or a request for assistance from an OAI developer to the OAI Support Group. In some cases these incidents fall under "normal" technical support issues, such as reporting a bug, requesting an enhancement to a product, or requesting additional information about the OAI toolkits. In other cases, these incidents will fall outside the realm of 'normal technical support' such as, requesting help on developing a specific OAI application, requesting help on using the various tools in the OAI toolkit, etc. These type of incidences escalate to a higher level, are handled by a "OAI Design Engineer", and are considered billable.

Following is a description of the two different OAI support levels:

1. Basic (Level #1) -- This support level is **free**. OAI developers would use this level to report bugs, submit PERs (Product Enhancement Requests), and request work-arounds for "known" problems.

2. Advanced (Level #2) -- This support for this level is **billable** as there will be a charge of **$20** per incidence and is provided by Inter-Tel "OAI Engineers". At this level Inter-Tel is guaranteed to respond to the customer in 1 working day.

Generally, an "Billable Incident" is considered to be up to 20 minutes of the "OAI Design Engineer's" effort. Each customer 'call' will be limited to one incident unless specifically discussed with and agreed to by the customer in advance (or during the call if it is a 'live call'). Thus, typically the "OAI Design Engineer" will make a best effort to answer the question or solve the problem in about 20 minutes. If the problem is expected to take considerably more time than 20 minutes, the "OAI Engineer" will give a 'best efforts' high-level answer in that 20 minute timeframe including a outline of the estimated steps to achieve a 'complete solution' and the estimated efforts.

Problems that turn out to be Inter-Tel product will NOT be considered a "Billable Incident" even if the call has escalated to the "Advanced" level.

Payment Methods for Billable Incidents

The following payment methods are available for "Billable" incidents:

1. **CREDIT CARD** - Your **VISA** or **MasterCard** credit card can be used to pay for "Billable" incidents. To expedite service, it is helpful if this credit card information is provided when the initial "Registration Form" is sent or FAXed into the OAI Support group. If this information is not provided on the "Registration Form", it will need to be provided on each 'call' (E-mail, telephone, or FAX) if 'Advanced' service level is to be provided.

2. **Bill-Back Method** - Some **Axxess** dealers will be allowed to be billed back (using the normal Inter-Tel billing cycle/procedures) for their "Billable" incidences.

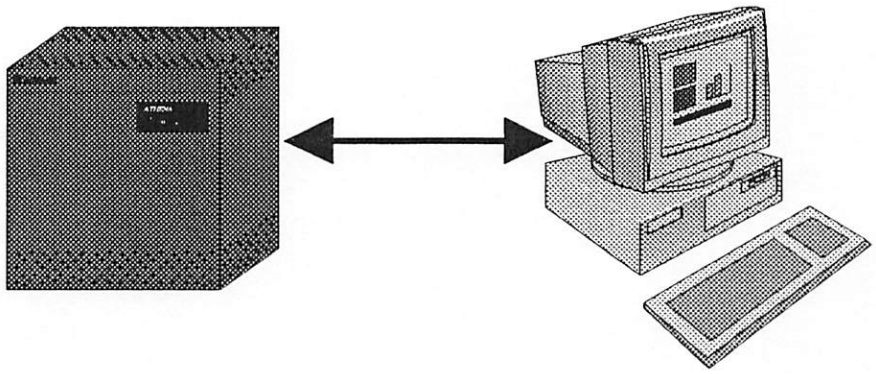
SECTION 2: Marketing Support

When you have developed a product or integrated an existing product to work with the ***AXXESS*** system, you may wish to market the product to other existing or potential ***AXXESS*** customers. If so, please contact the Inter-Tel Integrated Systems OAI Development group to discuss potential marketing opportunities.

SECTION 3: Protocol Specification

This section contains the detailed protocol specification for the *Axxess* **System OAI Link**.

AXXESS: System-Level OAI Protocol



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AXXESS: System-Level OAI

Protocol Overview:

This document describes the AXXESS System-Level Open-Architecture-Interface (OAI) protocol that is to be supported on an RS232 port of the AXXESS system. This protocol is loosely modeled from the CSTA standard and provides system event messages from the phone system so that an attached computer can support features like: ACD supervisor screen, ACD Real-time reports, ACD historical reports, etc.

The protocol is transmitted over standard RS232C ports and is encoded using standard ASCII characters. This allows for simple integration with virtually any 'host computer' or PC without use of any special interface hardware.

The AXXESS system uses 'ACD Hunt Group' objects for grouping of devices (sometimes referred to as 'agents') and calls to be monitored and reported on in this protocol. The system uses a call-based model to report on telephone calls. So when a call rings-in to an ACD hunt group (pilot number), it is considered an "ACD call", and the system will generate 'Call-related' event messages for that ACD call until it terminates, no matter what devices (inside or outside of the 'ACD Hunt Group') handle the call. For example, if an ACD call is answered by an agent and then transferred to a non-agent, status events will also be sent pertaining to the call at the non-agent.

Calls that ring in but didn't come in through the ACD pilot number are considered 'non-ACD' calls. Events for 'non-ACD' calls (including outgoing calls) will be sent whenever the calls are on an 'Agent' phone. Any extension listed in the ACD group, even if the extension is not presently LOGGED IN to the ACD group, is considered to be an 'Agent'. Reporting on 'Agents' that are not LOGGED IN is useful because extensions that aren't really agents (like IVR ports) can be included in an ACD list so that call events will be provided for those extensions.

In addition to 'Call-related' events, the system will report 'Agent-related' events for all agents being monitored in the 'ACD Hunt Group(s)'. This would include events not related to a call but related to an agent's status such as "DND", "forwarded", "ready", etc. Occasionally, call-related messages may supersede agent-related messages. For example, if an agent receives an ACD call a "DELIVERED" message will be sent, but a "NOT_READY" message might not be sent.

The system considers an agent 'implied busy' (and NOT READY to receive other ACD calls) whenever (1) an call (ACD or non-ACD call) is ringing on that device or (2) an agent is connected on a call. In those cases the system will not specifically send a NOT_READY event. If the agent becomes busy for other reasons the system will send a NOT_READY event and later a READY event when the agent becomes available again.

Commands Supported

At this time only a single command is honored as part of this protocol, but combining use of the "Desktop OAI" with this "System-Level OAI" many advanced applications can be achieved.

Commands sent to the phone system are not echoed and commands must be terminated with a <CR> character. The '***command-syntax***' is as follows:

<Command_ID>,<param #1>, ... ,<param #n><CR>

No specific response is sent to a command.

Any time during the input of a command a control-X can be sent to abort the command. It is a good practice to send a control-X when first starting to use a port to clear out any 'garbage' characters that may be have been received previously.

A deadman timer (30-seconds) is started once the first letter of the Command_ID is received. If the terminating <CR> is not received before the deadman timer expires, a Control-X input is assumed and the command is terminated.

RESYNCH REQUEST

This command should be sent whenever the attached computer suspects that it may have missed some events and is thus out of synchronization with the phone system. In response to this command the phone system will send a 'Resync Event' followed by numerous other events providing a complete 'refresh' of the status of all 'ACD' calls in progess and all monitiored stations. NOTE: To avoid being overloaded by an errant attached application, the system will only honor these requests if they are at least three minutes apart.

"RR" **Note:** No parameters are required with this command.

Example:
Request resynchronization to occur immediately.
RR

Event Messages

Overview:

Event messages are sent from the AXXESS system to allow an attached computer to monitor call activity for a defined group (or groups) of phones on the AXXESS system. Event messages are made up of an Event ID followed by fields, each separated by comma and then terminated with a <CR><LF> sequence.

Blank fields are always terminated by a trailing comma (","), unless the field is the last field of the response, in which case the field is simply omitted. All event ID and field values are in the range of printable ASCII characters.

Sequence Numbers:

To provide a means for an attached computer to detect if it has missed any events, an 'Event Sequence Number' is output by the system at the beginning of each event message. This sequence number is a 3-digit decimal number (000 through 999) followed by a Comma character, and increments by one for each new event.

Field Definitions:

Call status responses are generated for all calls that appear at the device whenever the call makes an important state transition. Any one call may generate numerous Call Status messages.

The following field values are used in many of the call status responses:

Call_ID:
The *Call_ID* is a string of characters (possible characters: 0123456789@#*PFX, Max length: 7 characters) assigned by the phone system to each call. This Call_ID serves as a reference identifier so that multiple simultaneous calls can be tracked though the system. The same Call_ID is kept for a call even as the call transfers between devices until the call is terminated.

CNX_ID:
The Connection_ID (*CNX_ID*) is a string of characters (possible characters: 0123456789@#*PFX, Max length: 7 characters) representing the connection number for the device.

Extensions:
The *Extension* parameters can represent either inside devices (i.e. Station Extensions, Hunt Group extensions, or Trunk extensions) or outside parties (i.e. Telephone number -- like 8005551234), but in all cases it is made up of digits (possible characters: 0123456789@#*PFX, 'Max length: 7 characters for inside devices and 24 characters for outside parties).

Agent_ID:
An *Agent_ID* is a string of characters (Max length: 7 characters) representing an agent. Often times this number will correspond to the device extension number that the agent is using, but it is not limited to this in cases where agents are not specifically tied to devices.

Agent_Name:
An *Agent_Name* is a string of characters (Max length: 20 characters) showing the agent's name. This field always has a vertical slash character (|) delimiting the beginning and end of the field. Typically it is LastName, FirstName but that format is not a requirement.

CNX_State:
This parameter identifies the type of connection for this call and is represented by a value as shown below:

Value	Description
N	None: No audio connection
S	Standard: 2-way audio connection
L	Listen-Only: 1-way receive-only audio connection
T	Transmit-Only: 1-way Transmit-only audio connection

Cause:
This parameter provides extra information as to what caused the event to occur:

Cause	Definition	Cause	Definition
ANS	Answered	NA	Not Answered
HU	Hang Up	TR	Transferred
NEW	New Call	CNF	Conference
HS	Hold - System	FW	Forwarded
HT	Hold for Transfer	HI	Hold - Individual
HC	Hold for CNF	RC	Recall
ANN	Announcement	MON	Monitor a Call (Snoop)

Resync_Code:
This 'Resync' code is a parameter in every event. For brevity of events, this field is 'blank' if the event is not part of a 'Re-synchronization', otherwise it contains a single character identifying the resynch event that caused the event.

Text Strings:
Some fields, like "DND_Message", are text strings in which case a vertical slash character is used at the beginning and end of the text string as delimiters.

CALL CLEARED

This event occurs when a call that was on a device is now terminating and clearing out of the system.

"CC," <Rsync_Code>,<Call_ID>, <Terminating_Ext>,<Cause>

Following are more details on the specific parameters:

<Terminating_Ext> - The extension that terminated the call - this will be either a Trunk Extension or a Station Extension.

Example:
Extension 105 hangs up call @001.
CC, , @001, 105, HU

CONNECTION CLEARED

This event occurs when a connection that was on a device is now terminating. The Call_ID and call are still 'alive' in the system at other extension(s), but the connection to the specified extension is now terminated. This can occur when an ACD is connected to an 'Announcement Device' and then the announcement completes.

"**XC,**" <Rsync_Code>,<Call_ID>, <Cnx_ID>,<Terminating_Ext>, <Cause>

Example:
Connection to Call @001 on Extension 299 is now cleared.
XC, , @001, 3, 299, HU

CONFERENCE

There is no specific conference event, but instead when a conference call is setup, calls are established with and/or transferred to a 'Conference Extension'. The 'Conference Extension' looks similar to a Call_ID and is unique for each individual conference. When a Conference call is terminated, the calls to the 'Conference Extension' are either cleared or transferred to another extension.

DELIVERED

This event occurs when the specified call is 'ringing' at the device.

"**DE,**" <Rsync_Code>,<Call_ID>, <Cnx_ID>, <Called_Ext>, <Trunk_Ext>,<Calling_Ext>,
<Originally_Called_Ext>, <Previously_ Alerted_Ext>,<Cause>

Following are more details on the specific parameters:

<Called_Ext> - The extension being alerted.

<Trunk_Ext> - The trunk extension for an outside call (blank if Intercom call)

<Calling_Ext> - The originator of the call. For a CO call, this will be the CallerID/ANI information (if available). For an IC call, this will be the calling party's extension.

<Originally_Called_Ext> - The initial call destination. This is the DNIS information if available. Otherwise, this is the hunt group extension.

<Previously_ Alerted_Ext> - The device that forwarded the call (if any).

Example:
An outside (CO) call from "6025551212" on a call to "8002225555" is now ringing directly (not transferred, FWDed, etc.) into Hunt Group Extension 237:
DE, , @001, 1, 237, 97061, 6025551212, 8002225555, , NEW

NOTE: When a call rings-in to an ACD hunt group with no available agents, a hunt group "DELIVERED" message will be sent without a station "DELIVERED" message. (This is a hunt group camp-on situation.) The hunt group "delivered" message will not contain a special indication of the camp-on status. Once an agent receives a call, then a station "delivered" message will be sent.

DIVERTED

This event occurs when a call that was 'DELIVERED' to a device is now being removed from that device because it failed to answer the call.

"**DI,** " <Rsync_Code>,<Call_ID>, <Cnx_ID>, <Diverted_From_Ext>,<Cause>

Example:
The agent at Extension 101 failed to answer call @001 so the call is now removed from Extension 101.
DI, , @001, 1, 101, NA

DND

This event occurs when a device goes into or out of Do-Not-Disturb. When the "DND_Message" field is blank, the device is going out of DND.

"**DND,** " <Rsync_Code>,<DND_Ext>, <DND_Message>, <DND_Text>

Following are more details on the specific parameters:

<DND_Message> - Up to sixteen character text string delimited at each end by a vertical slash
<DND_Text> - Up to sixteen character text string delimited at each end by a vertical slash

Example:
Extension 105 goes into DND with a message of "OUT TO LUNCH" "UNTIL 1 PM":
DND, ,105, |OUT TO LUNCH|, |UNTIL 1PM|
Extension 105 returns from lunch and removes DND from his phone:
DND, , 105, ,

ESTABLISHED

This event occurs when the specified call is answered or connected at the device and the device is now in the 'talking' state.

"**ES,** "<Rsync_Code>,<Call_ID>, <Cnx_ID>,<Subject_Ext>, <Trunk_Ext>,<Calling_Ext>, <Originally_Called_Ext>, <Previously_Alerted_Ext>, <CNX_State>, <Cause>

Example:
A outside (CO) call from "6025551212" on a call to "8002225555" is now ringing directly (not transferred, FWDed, etc.) is now answered by extension 105:
ES, , @001, 3, 105, 97061, 6025551212, 8002225555, , S, ANS

FORWARDED

This event occurs when a device turns on or off call forwarding.

"**FW,** " <Rsync_Code>,<Forwarding_Ext>,<Destination_Ext>, <Outside Number>,<FWD_Type>

Following are more details on the specific parameters:

<Outside Number> - If FWDing to an outside number it is contained here, otherwise this is blank.

FWD_Type	Description
I	Immediate
NA	No-Answer
B	Busy
NB	No Answer or Busy
N	None

Examples:

Extension 106 forwards all calls to extension 200:

FW, , 106, 200, , I

Extension 106 turns off Forwarding:

FW, , 106, , , N

Extension 106 forwards if-busy to trunk 97061 phone number 9619000:

FW, , 106, 97061, 9619000, B

HELD

This event occurs when a call that was 'ESTABLISHED' on a device has now been put on hold at that device.

"**HE,** " <Rsync_Code>,<Call_ID>,<Activate_Hold_Ext>, <Cause>

Example:

HE, , @001, 105, HI

LOGON

This event occurs when an 'Agent' logs onto a device to begin receiving ACD calls.

"**LN,** " <Rsync_Code>,<Agent_Ext>, <Agent_ID>,<Agent_Name>,<Hunt_Group_Extension>

Example:

Agent number 2003 logs on to Hunt group extenstion 237 at device extension 105.

LN, , 105, 2003,|Jones, Bob|, 237

LOGOFF

This event occurs when an 'Agent' logs off of a device to stop receiving ACD calls.

"**LF,** " <Rsync_Code>,<Agent_Ext>, <Agent_ID>,<Agent_Name>,<Hunt_Group_Extension>

Example:

Agent number 2003 logs out of Hunt group extension 237 at device extension 105.

LF, ,105, 2003, |Jones, Bob|, 237

NOT READY

This event occurs when an 'Agent' at a device is no longer available to receive ACD calls.

"**NRY,**" <Rsync_Code>,<Agent_Ext>, <Agent_ID>

Example:
Agent number 2003 at device extension 105 is no longer ready to receive calls.
NRY, ,105, 2003

READY

This event occurs when an 'Agent' now available to receive ACD calls again after being "Not Ready" previously.

"**RY,**" <Rsync_Code>,<Agent_Ext>, <Agent_ID>

Example:
Agent number 2003 at device extension 105 is now ready to receive calls again.
RY, , 105, 2003

RETRIEVED

This event occurs when a call that was 'HELD' on a device is now being reESTABLISHED at that device.

"**RE,** " <Rsync_Code>,<Call_ID>, <Retrieving_Ext>, <CNX_State>, <Cause>

Example:
Extension 105 retrieved call @001 from Hold.
RE, ,@001,105, S, ANS

RESYNCH

This event occurs in response to a 'Resynch Request' command or at power-up of the system. Following this event will be a complete set of events providing information on all 'ACD' calls in progress and the status of all monitored stations (agents), thus allowing the attached computer to 'ReSynchronize' with the phone system.

"**RS,** " <Rsync_Code>, <Date_Time>,<Protocol_Version>,<KSU_SW_Version>

Following are more details on the specific parameters:

<Resync_Code> - Single character showing reason for Resynch and the character that will be used in all following events caused by the resynch.
0 = Phone system Power-UP
1 = Response to Resynch Request

<Date_Time> - Date and time information from phone system allowing attached computer to synchronize clocks - format is in 'military time' as follows: "**HH:MM,MMDDYY**"

<Protocol_Version> - The version number of the System OAI protocol in use "Vxx.yy" where 'xx' is the major version and 'yy' is the revision number.

<KSU_SW_Version> - The version number of the AXXESS KSU software in use "Vxx.yyy" where 'xx' is the major version and 'yyy' is the revision number.

Example:

The phone system has received the Resynch Request at 5:25AM, January 24, 1994.
RS, 1, 05:25, 012494,V01.01,V02.000

TRANSFERRED

This event occurs when a call is being transferred from one device to another device.

"**TR,** " <Rsync_Code>,<Call_ID>,<Transferring_Ext>, <Receiving_Ext>, <Cause>

Example:

Extension 105 transfers call @001 to extension 210.
TR, , @001, 105, 210, TR

NOTE: After a "TRANSFERRED" message is sent, it will be followed by a "DELIVERED", "HELD", or "ESTABLISHED" message to indicate the state of the call after the transfer.

WORK NOT READY

This event occurs when an 'Agent' at a device is busy with the task of serving the previous call and is not yet available to receive calls.

"**WNR,**" <Rsync_Code>,<Agent_Ext>, <Agent_ID>

Example:

Agent number 2003 at device extension 105 is now "wrapping up" work from the last call.
WNR, , 105, 2003

Appendix A - Example Scenarios

Event Examples:

The following event examples are captured from a live AXXESS System OAI port, and show some typical call scenerios. The format of these events are idential to those use by the "Axxess - System OAI Simulator" program where lines starting with two forward slashes are comment lines and lines with "@PAUSE" pause the simulator to wait for manual restart. Thus, lines starting with a 3-digit number (the sequence number) are the actual events from the Axxess System.

1. Call Rings into a Hunt Group and progesses...:

Example:

```
//Call rings into hunt group (EVENT1)
@PAUSE
112,DE,,@09X,@09X,259,94321,,259,,NEW
//Call hunts for first agent (EVENT2)
@PAUSE
113,DE,,@09X,@09@,108,94321,,259,,NEW
//Call hunts for next avail. agent (EVENT3)
@PAUSE
114,DI,,@09X,@09@,108,NA
115,DE,,@09X,@0*0,109,94321,,259,,NEW
//Call answered by agent (EVENT4)
@PAUSE
116,NRY,,109,109
117,ES,,@09X,@09X,94321,,94321,259,,S,ANS
118,ES,,@09X,@09X,109,94321,,259,,S,ANS
//Call put on hold and removed from hold by agent (EVENT5)
@PAUSE
119,HE,,@09X,109,HI
120,RE,,@09X,109,S,ANS
//Agent transfers call to another agent (EVENT6)
@PAUSE
121,HE,,@09X,109,HT
122,DE,,@0*1,@0*1,111,,109,111,,NEW
123,NRY,,111,111
124,ES,,@0*1,@0*1,109,,109,111,,S,ANS
125,TR,,@09X,109,111,TR
126,CC,,@0*1,109,HU
127,WNR,,109,109
128,DE,,@09X,@09X,111,94321,,111,,TR
129,RY,,111,111
130,NRY,,111,111
131,ES,,@09X,@09X,94321,,94321,259,,S,ANS
132,ES,,@09X,@09X,111,94321,,111,,S,ANS
133,RY,,109,109
//Agent hangs up (EVENT7A)
@PAUSE
134,CC,,@09X,111,HU
135,CC,,@09X,94321,HU
136,WNR,,111,111
137,RY,,111,111
//If CO call hangs up first, reverse lines 134 and 135.
@PAUSE
```

2. Agent Goes Busy doing some feature and then Idle again:

Example:

```
//Agent goes offhook (busy) (EVENT8).
@PAUSE
181,NRY,,111,111
//Agent goes idle (EVENT9).
@PAUSE
182,RY,,111,111
```

3. Agent goes into DND and back out again:

Example:

```
//Agent goes into DND.
@PAUSE
183,NRY,,111,111
184,DND,,111,|ON VACATION|,|BACK MONDAY 11/5|
185,RY,,111,111
//Agent goes out of DND.
@PAUSE
186,DND,,111,,
187,NRY,,111,111
188,RY,,111,111
```

4. Agent Logs ON & then Logs OFF:

Example:

```
//ACD agent logs ON.
@PAUSE
189,NRY,,111,111
190,LN,,111,111,|DKTS D|,259
191,RY,,111,111
//ACD agent logs OFF.
@PAUSE
192,NRY,,111,111
193,LF,,111,111,|DKTS D|,259
194,RY,,111,111
```

5. Agent makes an outgoing call, sets up Conference call, ...

Example:

```
//Agent (x111)  makes an outgoing call (EVENT12).
@PAUSE
195,NRY,,111,111
196,DE,,@0#6,@0#6,9201,,111,9201,,NEW
197,DE,,@0#6,@0#7,94200,,111,9201,,NEW
198,ES,,@0#6,@0#6,111,94200,111,94200,,S,ANS
199,ES,,@0#6,@0#6,94200,,111,9201,,S,ANS
//Agent sets up a conf. with another agent (x113)(EVENT13).
@PAUSE
200,HE,,@0#6,111,HC
201,DE,,@0#8,@0#8,113,,111,113,,NEW
202,NRY,,113,113
203,ES,,@0#8,@0#8,111,,111,113,,S,ANS
204,ES,,@0#8,@0#8,113,,111,113,,S,ANS
205,HE,,@0#8,111,HC
206,TR,,@0#6,111,@1PP,CNF
207,TR,,@0#8,111,@1PP,CNF
208,ES,,@0#6,@0#6,94200,,94200,@1PP,,S,CNF
209,ES,,@0#8,@0#8,113,,113,@1PP,,S,CNF
210,ES,,@0#9,@0#9,111,,111,@1PP,,S,CNF
//Agent (x111) drops out of the conference (EVENT14).
@PAUSE
211,CC,,@0#9,111,HU
```

```
212,RY,,111,111
213,CC,,@0#8,113,HU
214,TR,,@0#6,@1PP,113,CNF
215,ES,,@0#6,@0#6,94200,,113,9201,,S,ANS
216,ES,,@0#6,@0#6,113,94200,,113,,S,ANS
```

6. Agent sets up a conference call with 2 outside calls, then terminates the call

Example:

```
//Agent makes a CO Call.
@PAUSE
234,NRY,,111,111
235,DE,,@0P0,@0P0,9201,,111,9201,,NEW
236,DE,,@0P0,@0P1,94200,,111,9201,,NEW
237,ES,,@0P0,@0P0,111,94200,111,94200,,S,ANS
238,ES,,@0P0,@0P0,94200,,111,9201,,S,ANS
//Agent establishes a CNF call with a second CO call.
@PAUSE
239,HE,,@0P0,111,HC
240,DE,,@0P2,@0P2,9201,,111,9201,,NEW
241,DE,,@0P2,@0P3,94199,,111,9201,,NEW
242,ES,,@0P2,@0P2,111,94199,111,94199,,S,ANS
243,ES,,@0P2,@0P2,94199,,111,9201,,S,ANS
244,HE,,@0P2,111,HC
245,TR,,@0P0,111,@1F9,CNF
246,TR,,@0P2,111,@1F9,CNF
247,ES,,@0P0,@0P0,94200,,94200,@1F9,,S,CNF
248,ES,,@0P2,@0P2,94199,,94199,@1F9,,S,CNF
249,ES,,@0P4,@0P4,111,,111,@1F9,,S,CNF
//The agent hangs up terminating the call (EVENT16)
@PAUSE
250,CC,,@0P4,111,HU
251,RY,,111,111
252,CC,,@0P0,94200,HU
253,CC,,@0P2,94199,HU
```

7. Agent answers an ACD call. Then the Supervisor begins monitoring the call, ...

Example:

```
//An agent answers an ACD Call.
@PAUSE
055,DE,,@0#@,@0#@,274,,103,274,,NEW
056,DE,,@0#@,@0P0,100,,103,274,,NEW
057,NRY,,100,100
058,ES,,@0#@,@0#@,103,,103,100,,S,ANS
059,ES,,@0#@,@0#@,100,,103,274,,S,ANS
//A Supervisor begins monitoring the call.
@PAUSE
060,NRY,,104,104
061,ES,,@0P1,@0P1,104,,104,@167,,S,MON
062,ES,,@0#@,@0#@,@167,,104,100,,L,MON
//The Supervisor Terminates monitoring.
@PAUSE
063,CC,,@0P1,104,HU
064,RY,,104,104
065,XC,,@0#@,@0#@,@167,HU

//An Agent answers an ACD Call.
@PAUSE
070,DE,,@0P2,@0P2,274,,103,274,,NEW
```

071,DE,,@0P2,@0P3,100,,103,274,,NEW
072,NRY,,100,100
073,ES,,@0P2,@0P2,103,,103,100,,S,ANS
074,ES,,@0P2,@0P2,100,,103,274,,S,ANS
//A Supervisor begins monitoring the call.
@PAUSE
075,NRY,,104,104
076,ES,,@0P4,@0P4,104,,104,@16F,,S,MON
077,ES,,@0P2,@0P2,@16F,,104,100,,L,MON
//The agent terminates the call.
@PAUSE
078,WNR,,100,100
079,CC,,@0P2,100,HU
080,CC,,@0P2,103,HU
081,CC,,@0P4,104,HU
082,RY,,104,104

8. An ACD Call Recalls from Hunt Group

Example:

//Call ringing HG 259, goes unaswered.
@PAUSE
363,DE,,@0FP,@0FP,259,94321,,259,,NEW
364,DE,,@0FP,@0FF,108,94321,,259,,NEW
365,DI,,@0FP,@0FF,108,NA
366.DE,,@0FP,@0FX,109,94321,,259,,NEW
367,DI,,@0FP,@0FX,109,NA
368,DE,,@0FP,@0F@,110,94321,,259,,NEW
369,DI,,@0FP,@0F@,110,NA
370,DE,,@0FP,@0X0,111,94321,,259,,NEW
//The call is disconnected from 259 by a RC and rings HG 260.
@PAUSE
371,DI,,@0FP,@0FP,259,RC
372,DE,,@0FP,@0FP,260,94321,,260,,NEW
373,DI,,@0FP,@0X0,111,RC
374,DE,,@0FP,@0X1,107,94321,,260,,RC

9. An ACD Call goes to an Announcement device.

Example:

//A CO ACD Call enters the hunt group.
@PAUSE
401,DE,,@0X7,@0X7,259,94321,,259,,NEW
402,DE,,@0X7,@0X8,108,94321,,259,,NEW
403,DI,,@0X7,@0X8,108,NA
//Call auto advances to next stn. an Announcement device.
@PAUSE
404,DE,,@0X7,@0X9,109,94321,,259,,NEW
405,DE,,@0X7,@0X*,100,94321,,259,,ANN
//Announcement Station Answers and Announces.
@PAUSE
406,NRY,,100,100
407,ES,,@0X7,@0X7,94321,,94321,259,,S,ANS
408,ES,,@0X7,@0X*,100,94321,,259,,S,ANN
409,XC,,@0X7,@0X*,100,HU
410,RY,,100,100

SECTION 4: Application Notes

This section contains short descriptions, usually 1 to 2 pages, describing sample applications that could be or have been implemented using the ***Axxess* System OAI Link**. We welcome descriptions of additional applications that you may come up with that we can share with other Axxess OAI developers.

LAN-based Station Status Display using System OAI link 10/26/94

Overview:

Historically, phone systems display of the status of other telephones has been limited to a few blinking lamps on your phone (sometimes referred to as a BLF -- blinking lamp field). That is, you could see what is happening on someone else's phone by deciphering the blinking lights on your phone. This information is usually both very limited (i.e., "Idle" = Lamp off, "Ringing" = Lamp flashing fast, "Do-Not-Disturb" = Lamp flashing slow, "Busy" Lamp on steady) and hard to understand.

Now, with the *Axxess* phone system (using V2.0 software) connected to the business computer system (using a "System OAI" link), this "Station Status" information can instead be displayed on the computer screen at each desktop (using text, multiple-colors, etc.) and the information can be much more detailed and easier to read. For example the information could include: User Name, Extension Number, Busy/Idle/Ringing status, Forwarding status, Do-Not-Disturb message (i.e., "On Vacation 'Til June 7th").

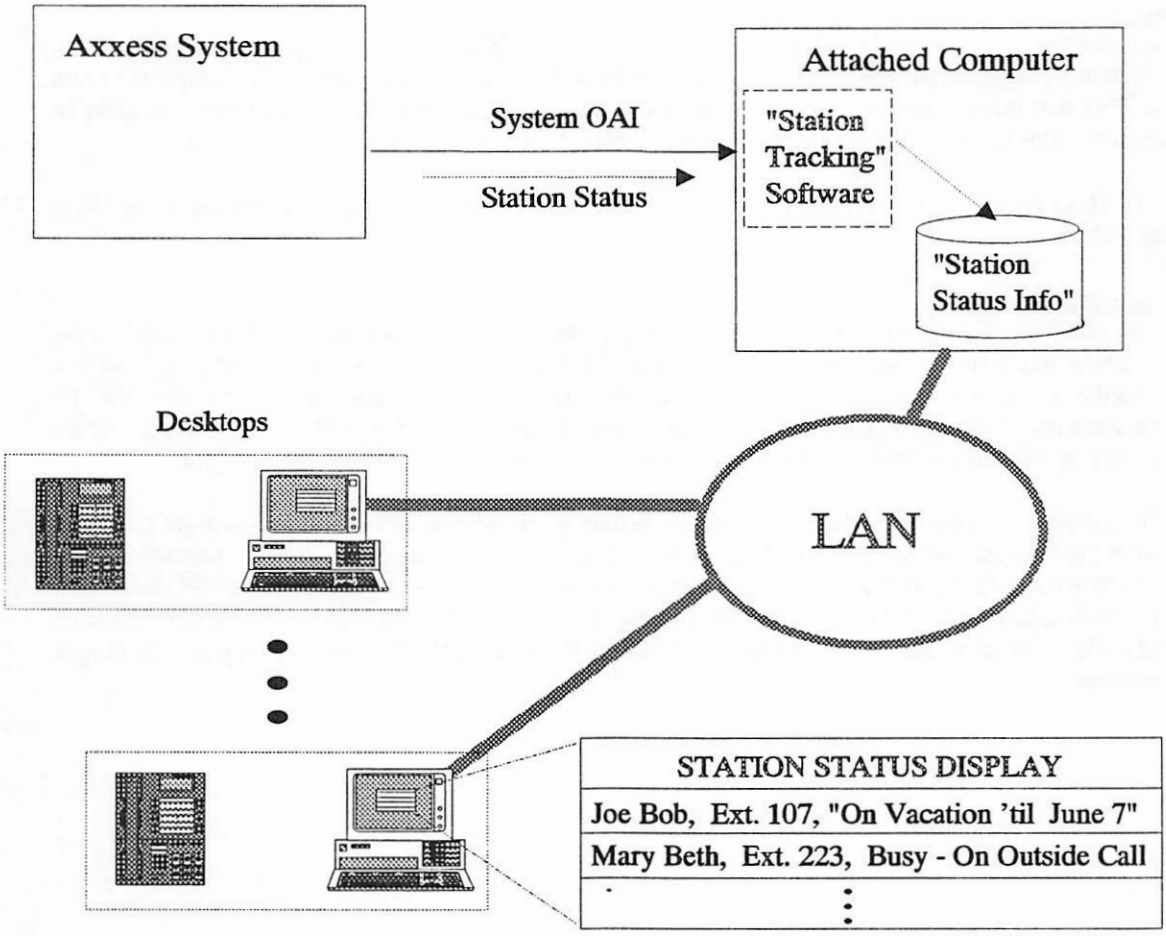
Setup:

A "System OAI" link from the *Axxess* system is attached to an "Attached Computer". The "Attached Computer" is running some "Station Tracking" server software and is connected over a LAN to the desktop PCs that are running "Station Status Display" software (which is a 'client software' of the "Station Tracking" server software). As phones change status this information is sent over the "System OAI" link to the "Attached Computer" and then is appropriately displayed onto the screens of the desktop PCs.

Please refer to the attached drawing for details.

AXXESS (Version 2.0)

LAN-based Station Status (BLF)



AXXESS -- Application Note

'Standard' ACD enhanced with OAI link: 12/15/93

This application note describes how the AXXESS 'System OAI' link (software Version 2.0) can be used with an attached 'Host computer' to provide enhancements to the 'Standard' ACD features..

Setup:

A host computer running ACD software is attached to an AXXESS system through a 'System OAI' link. The system OAI link from the AXXESS is programmed to send events for the ACD group (extension 237). This will provide information on all call and agent activity for that group. Note that this could be set up to monitor multiple different ACD groups if required (please refer to attached diagram).

The AXXESS system is programmed to have ACD calls routed directly to the pilot extension of the 'ACD group'. Thus,

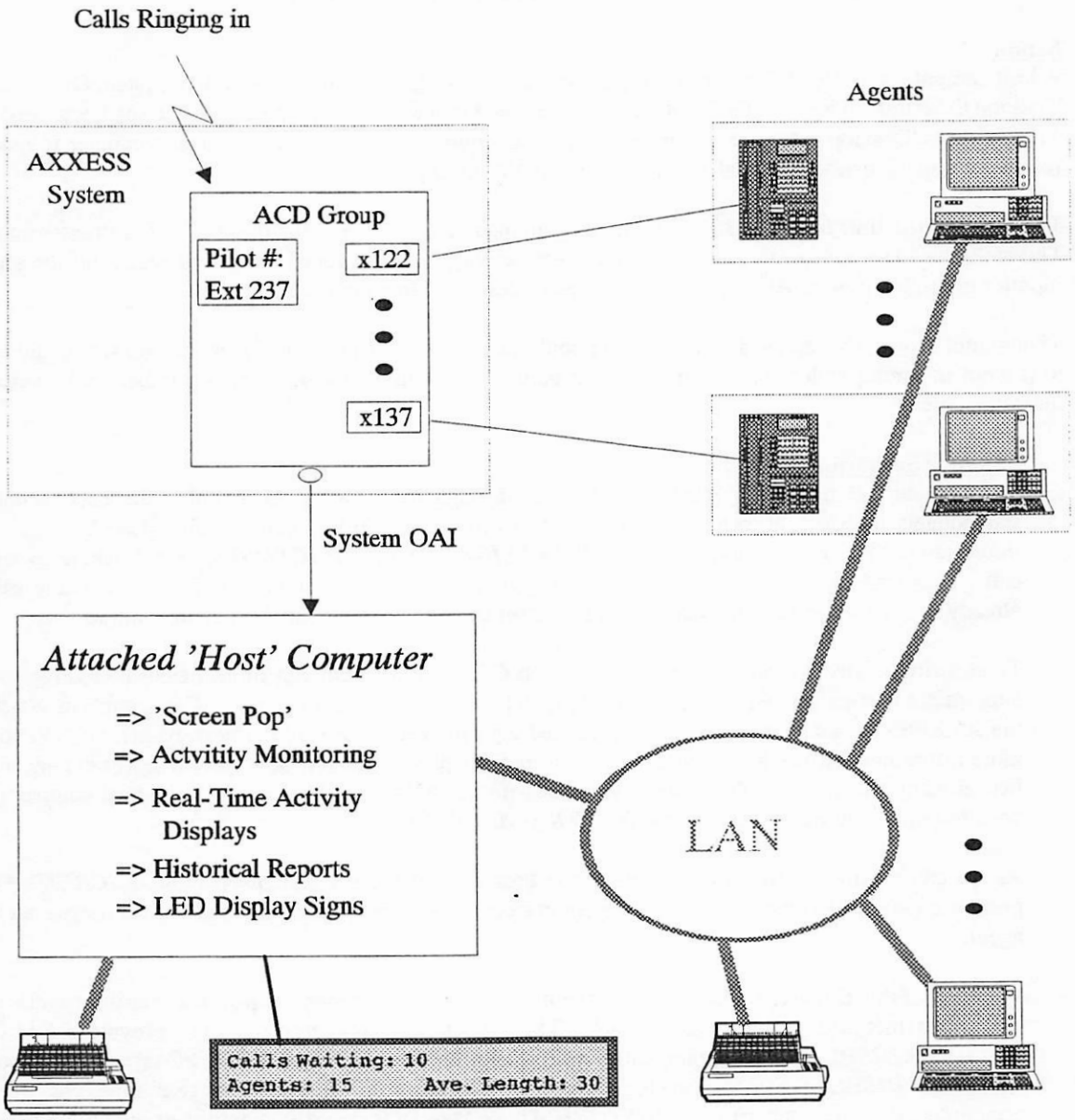
Example Scenario:

An outside call rings directly into the ACD group (extension 237), and begins to hunt for the next available agent (using the programmed algorithm for that ACD group). When the call is directed to a specific agent, the host computer is notified with an appropriate event (including Caller_ID/ANI information if available) so that it can simultaneously do a ***SCREEN POP*** to present appropriate computer data on the agent's computer screen before the call is even answered by the agent.

In addition, the host computer is receiving real-time event information on all call activity occurring on all extensions included in the 'ACD group'. Thus the host computer could (1) provide ***REAL-TIME ACTIVITY DISPLAYS*** for agents, calls waiting, etc. on the ACD supervisor's PC/terminal , (2) control large ***LED DISPLAY SIGNS*** showing number of calls waiting, average answer time, etc., plus (3) accumulate data and then print out ***HISTORICAL REPORTS*** for weekly, monthly, or annual reviews.

AXXESS

'Standard' ACD: Enhanced with OAI connection



AXXESS -- Application Note

Advanced ACD using OAI links: 12/15/93

This application note describes how an Advanced ACD could be implemented using the combination of the AXXESS system's 'Desktop OAI' and 'System OAI' links (Axxess software Version 2.0).

Setup:

A host computer running ACD software is attached to an AXXESS system using both a 'System OAI' link and a 'Desktop OAI' link. The AXXESS system is programmed to have all calls ring directly to the keyset (extension 110) with its 'Desktop OAI' link connected to the host computer. This allows the host computer to make call routing decisions instead of all calls going directly to the ACD group.

The system OAI link from the AXXESS is programmed to send events for the ACD group (extension 237). This will provide information on all call and agent activity for that group. Note that this could be set up to monitor multiple different ACD groups if required (please refer to attached diagram).

Though not shown, the attached host computer could also have "IVR ports" under its control that could be used to prompt incoming callers for additional information (i.e. phone number, account number), take voice mail messages, etc.

Example Scenario:

An outside call rings into extension 100 and, through the 'Desktop OAI' link, the host computer is immediately notified of the call along with calling party information (Caller_ID/ANI) and DNIS information. The host computer can use ***INTELLIGENT CALL ROUTING*** to decide where to send the call. This routing decision could include using the date, time of day, day of week, how many calls are already waiting in queue, calculated average answer time, the calling party's telephone number, etc.

Then, using a 'Divert' command on the 'Desktop OAI' link, the call can immediately be redirected to an appropriate destination while it is still ringing. This destination could be the 'ACD group' (in which case the AXXESS system would use its programmed algorithm to route it to the next agent), an "IVR port" if more information is needed from the caller, an outside phone number, or a specific agent extension. In lieu of using the 'hunting algorithms' available with the AXXESS 'ACD groups', the host computer may want to implement its own ***CUSTOM HUNTING ALGORITHMS***.

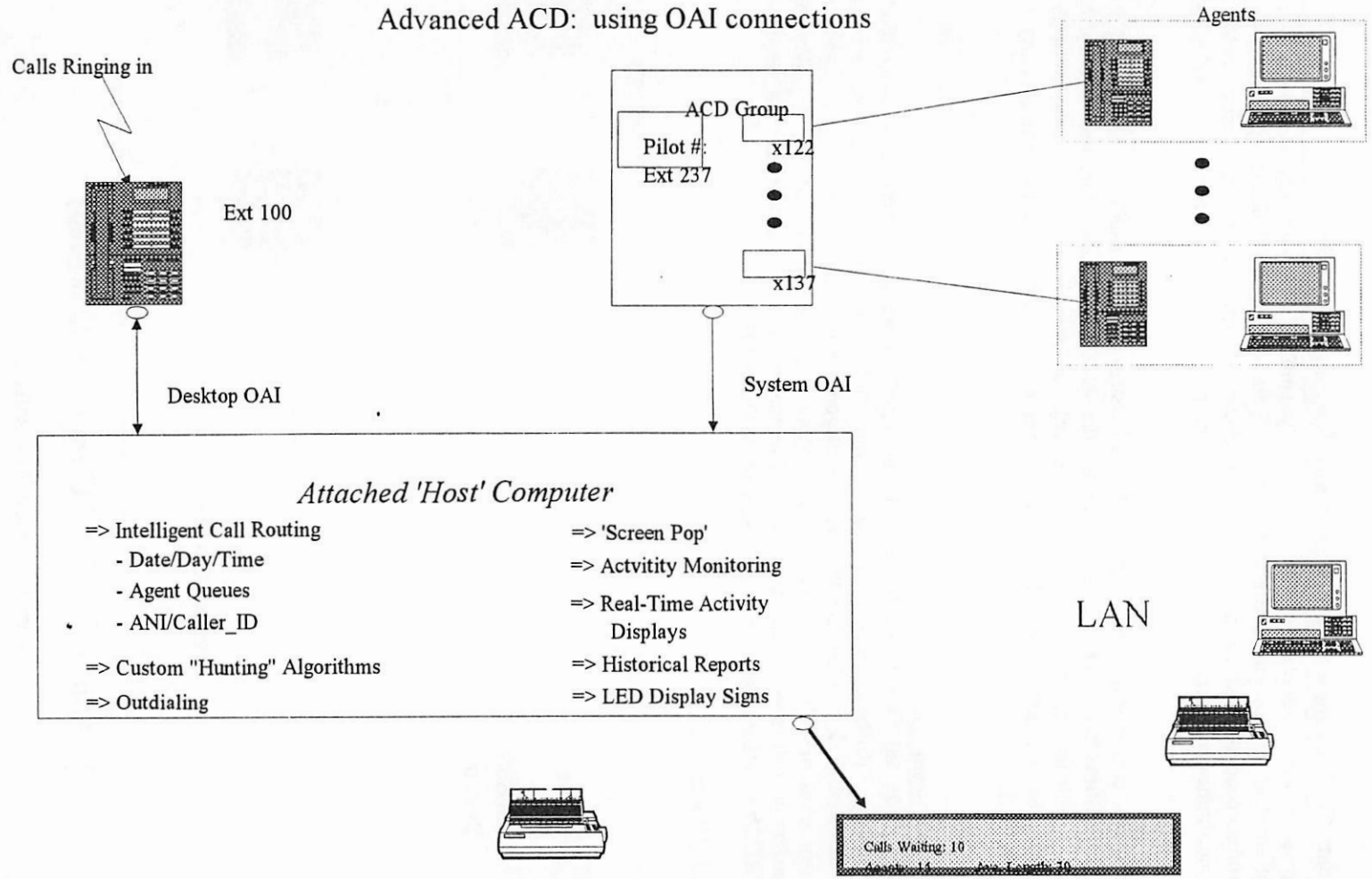
As the call is directed to a specific agent, the host computer can simultaneously do a ***SCREEN POP*** to present appropriate computer data on the agent's computer screen before the call is even answered by the agent.

While all of this call activity is occurring, the host computer is receiving real-time event information on all extensions included in the 'ACD group'. Thus the host computer could (1) provide ***REAL-TIME ACTIVITY DISPLAYS*** for agents, calls waiting, etc. on the ACD supervisor's PC/terminal , (2) control large ***LED DISPLAY SIGNS*** showing the number of calls waiting, average answer time, etc., plus (3) accumulate data and then print out ***HISTORICAL REPORTS*** for weekly, monthly, or annual reviews.

In addition, when incoming call activity slows down, the host computer could perform ***OUTDIALING*** to place outgoing calls (1) back to 'unserviced callers', (2) to follow-up on marketing leads, (3) to telemarket for new customers, etc. Outgoing calls can be initiated using the 'Desktop OAI' link and then immediately sent to an idle agent while still ringing (along with an appropriate 'Screen Pop'). Or, if the host computer is equipped with IVR ports, the IVR ports could be used to place the calls, wait for the call to be answered, and then transfer the call to an idle agent.

AXXESS

Advanced ACD: using OAI connections



CONFIDENTIAL - Inter-Tel Engineering

"Screen-Pop" using a "mainframe" and System OAI link: 10/20/94

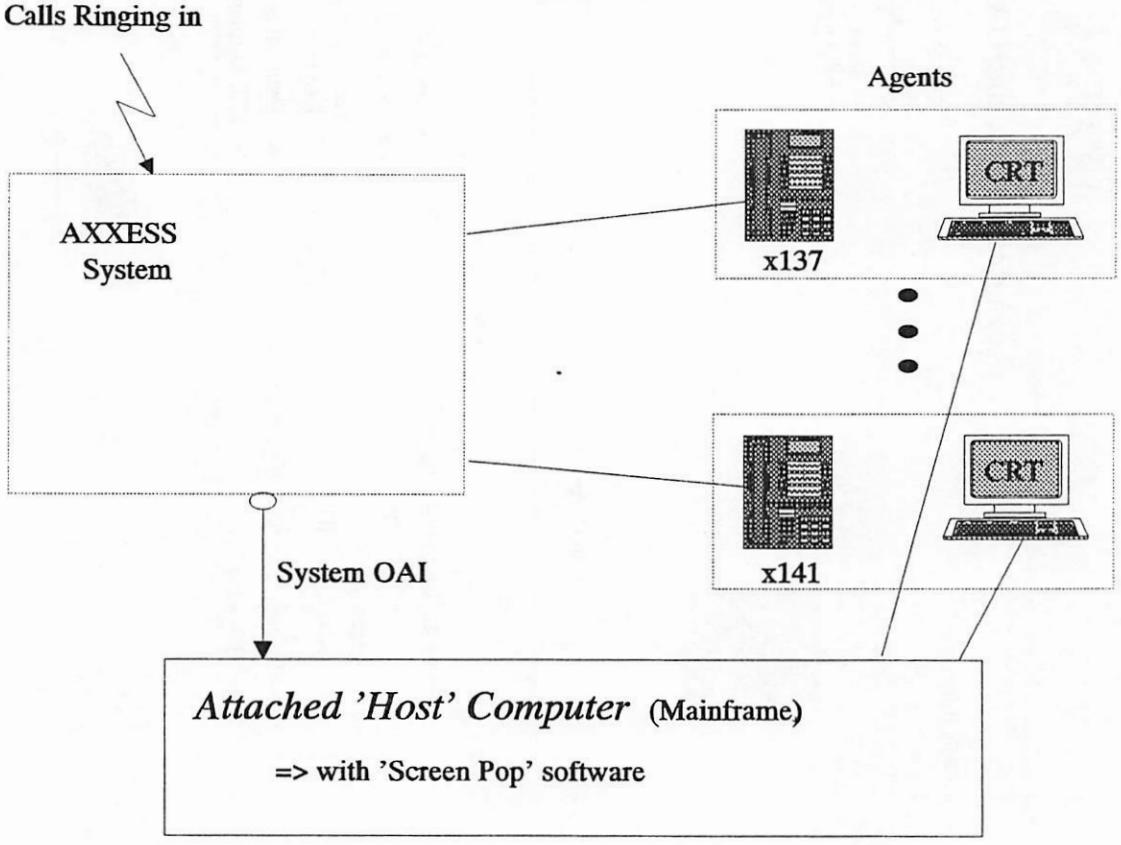
This application note describes how the AXXESS 'System OAI' link (software Version 2.0) can be used with an attached 'mainframe' computer to provide "Sceen-Pop" (simultaneously presenting a screen on the Terminal concurrent with a call ringing on the phone). In actuality, the 'mainframe' could actually be a true mainframe computer, a mini-computer (i.e. running UNIX), or even a 'client-server' LAN.

Setup:

A 'mainframe' computer is attached to an AXXESS system through a 'System OAI' link and is therefore receiving real-time events describing activity on the AXXESS system. Included in these events are "Ringing" events for each phone in the system, so with this information an appropriate software program running on the 'mainframe' could present a sceen of information on the calling party (based on Caller_ID/ANI).

Example Scenario:

An outside call rings into extension 137 and simultaneously the 'mainframe' is notified with an appropriate "Ringing" event (including Caller_ID/ANI information if available) so that it can simultaneously do a ***SCREEN POP*** to present appropriate computer data on the agent's computer screen before the call is even answered by the agent. If extension 137 answers the call and then later transfers the call to extension 141, another "Ringing" event with be sent to the 'mainframe' so it can ***SCREEN POP*** the terminal on the desktop of extension 141.



AXXESS -- Application Note

Employee Tracking and Call Routing using OAI links: 2/9/94

This application note describes how the AXXESS OAI links (Axxess software Version 2.0) can be attached to an 'employee tracking' system so that calls for that person can automatically be routed to the nearest phone.

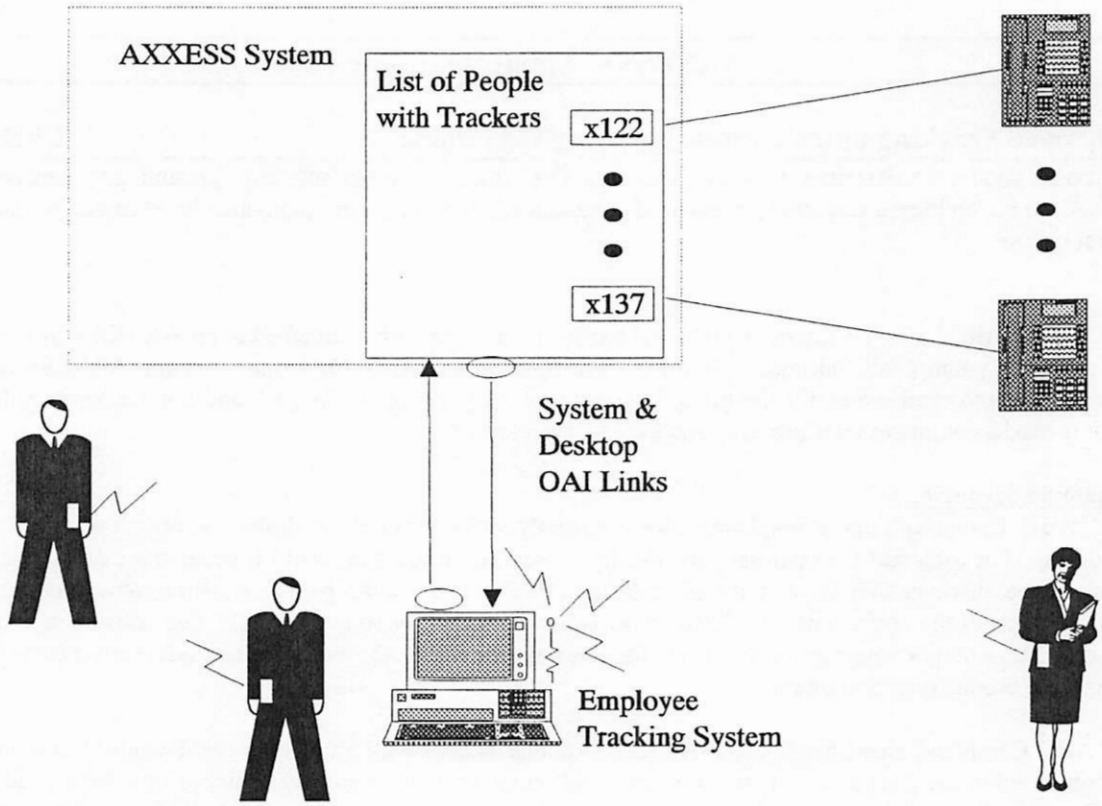
Setup:

A computer (PC) with a 'Employee-Tracking' hardware and software is attached to an AXXESS system through a 'System OAI' link and a 'Desktop OAI' link.. The system OAI link from the AXXESS is programmed to send events for the group of people wearing 'Tracking Badges', and the 'Desktop OAI' link is used a command interface to re-route calls as necessary.

Example Scenario:

At "ABC Company" many employees are constantly away from their desks roaming though the building. For each call the operator received for these employees, she would transfer the call to their desk phone, discover they weren't at their desk, and then use the Audio paging system to announce the call throughout the entire building (*"Bob Jones you have a call on your phone."*). The constant audio paging was a major interruption to all of the other employees in the building and adversely affected employee productivity and moral.

"ABC Company" then installed the AXXESS phone system with an "Employee Tracking" system connected to the phone system (see drawing). All employees that roam the building now wear small 'Tracking Badges' which lets the tracking system know where they are in the building. Whenever their phone begins to ring, the tracking system checks the employee's location, and if they are away from their desk, it re-routes their call to the phone closest to them.


AXXESS System
List of People
with Trackers
x122
x137
System &
Desktop
OAI Links
Employee
Tracking System

AXXESS -- Application Note

In-House Paging System using OAI link: 1/18/94

This application note describes how the AXXESS 'System OAI' link (Axxess software Version 2.0) can be attached to an "In-House" paging system to automatically beep each person's beeper whenever their phone rings.

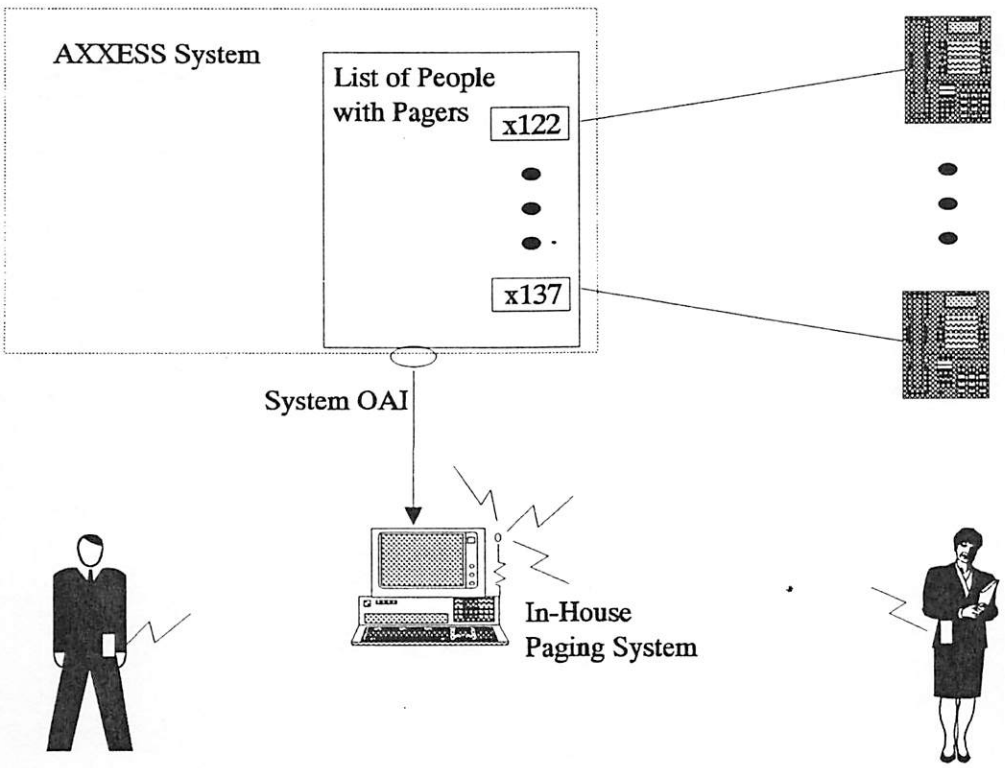
Setup:

A computer (PC) with a In-House Paging board and software is attached to an AXXESS system through a 'System OAI' link. The system OAI link from the AXXESS is programmed to send events for the group of people wearing pagers.

Example Scenario:

At "ABC Company" many employees are constantly away from their desks roaming though the building. For each call the operator received for these employees, she would transfer the call to their desk phone, discover they weren't at their desk, and then use the Audio paging system to announce the call throughout the entire building (*"Bob Jones you have a call on your phone."*). The constant audio paging was a major interruption to all of the other employees in the building and adversely affected employee productivity and moral.

"ABC Company" then installed the AXXESS phone system with an "In-House Paging" system connected to the phone system (see drawing). All employees that roam the building now wear small pagers (beepers) on their belts. Whenever their phone begins to ring their pager is also 'beeped' through the "In-House Paging" system, and the employee can then proceed to the closest phone and perform a Call Pickup (reverse transfer) to answer the call on his/her phone. Audio paging has been all but eliminated and is now reserved for emergency purposes only.



SECTION 5: Development Tools

Since the *Axxess* **System OAI Link** uses a standard RS232 port and the protocol is implemented using the 'visible' section of the ASCII character set, it is very easy to simply connect it up to a standard COM port of a PC. Then, using an off-the-shelf terminal emulator (like TERM provided with MS-Windows), you can easily monitor on the screen and capture to a disk file the event output from the *Axxess* **System OAI Link.**

If you don't have immediate access to an *Axxess* system, you may find the enclosed "*Axxess* **System OAI Port Simulator**" quite useful. This simulator runs under MS-Windows and can simulate the generation of 'real' Axxess System OAI events out of a COM port of the PC which can then be attached as an input into your development system.

AXXESS System OAI Port Simulator

Overview:

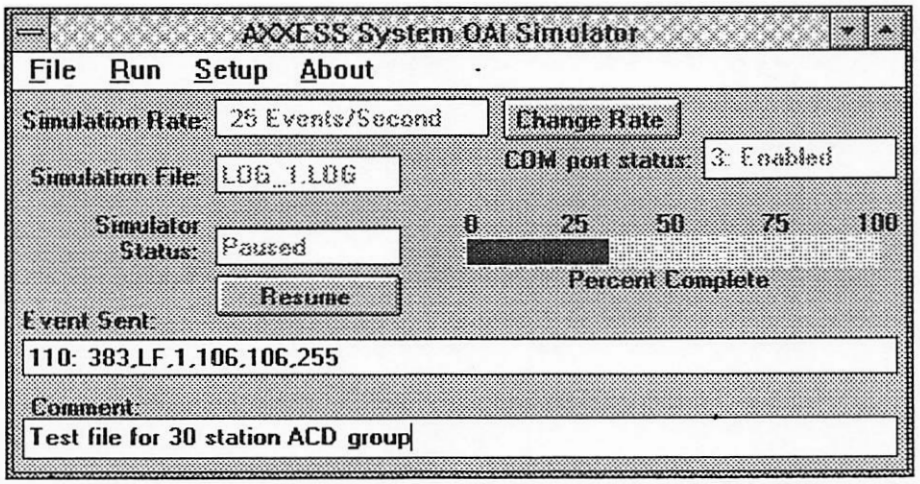
This program, called ***SysSim***, is a MS-Windows based program that can 'Simulate' the output of an AXXESS System OAI port, so that OAI application programs can be developed without having an AXXESS system. It does this simulation by reading System OAI events (captured from a real AXXESS system) from a disk file and then sending them out a user-selectable COM (RS232) port at a user-programmable rate. The output of this RS232 port can be connected over to another development or test computer, or wrapped right back to another COM port on the same PC.

Installing *SysSim*:

The program can be installed using MS Windows program manager by selecting **Run** and the filename: **SETUP.EXE** from the installation floppy disk. Once installed under windows you can simply double-click on the ***SysSim*** Icon to run the program.

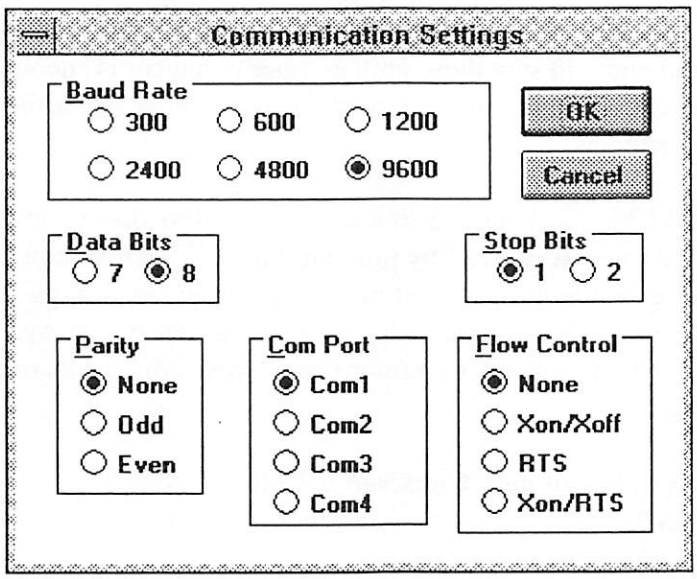
Using *SysSim*:

From the **File** menu any event file can be opened and, once opened, the events from the file can be output at a user selectable **Simulation Rate** (from 1 event every 10 seconds to 25 events per second). When the simulator is running it can be Paused and Resumed by simple keypresses or menu selection allowing the user to stop and restart as necessary. It also has a **Single-Step Mode** which will automatically *Pause* after each event.



RS232 Inteface:

The ***SysSim*** program can output to any COM port (COM1 - COM4) of the PC with selectable parameters as shown in the following screen. Output to the COM port must be enabled from the **Setup** menu (when enabled a ✓ is shown next to **RS232 Port Enabled)** otherwise the events are only shown in the simulator and not output at all. The the **COM Port Status:** in the upper-right corner of the main screen shows when a COM port is enabled, and whether it has been PAUSED (transmission stopped by Handshaking).



Exiting *SysSim*:

You exit the program from the **File** menu by chosing **Exit** option. Upon exit, the settings for ***SysSim*** are saved ("SYSSIM.DAT" file) so they can be recalled and reused the next time ***SysSim*** is used.

Event Files:

The simulator's event files contain actual events captured directly from an AXXESS system. Special 'commands' can then be added to an event file (using a simple text editor) to provide extra control of the simulator while running from an event file. These 'commands' are as follows:

1. **Comment line** - (starts with two forward slashes "//") - These comments can be used to explain what the upcoming events are in the file. A comment should be 60 characters or less. The comment will appear on the simulator screen when it is encountered and will stay there until another comment is encountered. It is a good idea to always put a comment as the first line in an event file to explain what the file contains.

2. **Pause - (@PAUSE)** - When the simulator encounters this command on a line it will 'Pause' until it is 'Restarted' by pressing the *RESUME* button. This is useful to separate events into 'groups' that potentially represent a single action. For example, when an agent sets up a Conference call, five events may be generated, so you might want to use the **Comment** and **Pause** commands to group those five events like:

   //About to Simulate a Conference Call
   @PAUSE
   ...event #1
   ...event #2
   ...event #3
   ...event #4
   ...event #5
   //Conference Call is now setup
   @PAUSE

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